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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/726,337	12/01/2000	Hongyong Zhang	0756-2228	1080

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EXAMINER

COLEMAN, WILLIAM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/726,337

Applicant(s)

ZHANG ET AL.

Examiner

W. David Coleman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Content Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 19.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed December 2, 2002 have been fully considered but they are not persuasive.
2. Applicants contend that the art rejection of independent claims 2 and 3 does not teach or suggest all the elements either explicitly or inherently. Particularly, Applicants claim that Yonehara et al., U.S. Patent 5,422,302 herein known as Yonehara (302) fails to teach a plurality of crystal grains parallel with a plane which is in parallel with the source region, the drain region and the channel formation region.
3. In response to Applicants contention that Yonehara (302) fails to teach a plurality of crystal grains parallel with a plane which is in parallel with the source region, the drain region and the channel formation region, Yonehara (302) explicitly teaches such a device. Column 4, lines 37-41 discloses the direction of the crystal grains as claimed. Yonehara (302) discloses "a specific crystal direction grows parallel to the substrate due to anisotropy relative to the crystal surface of the interface energy at the interface between the deposited material and the substrate." Yonehara further states that the object of the present invention is to provide multi-layer structure semiconductor device with high performance elements using single or polycrystals (i.e., plurality of crystals), and method for producing the same easily and with high reliability (column 2, lines 36-40).
4. Applicants contend that the art rejection of claims 4-7, 12, 15, 18 and 21 does not teach or suggest all the elements of the independent claims, either explicitly or inherently.

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5. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the grain boundaries may be controlled by controlling the nucleus forming site.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 2 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Yonehara, U.S. Patent 5,422,302.

9. Pertaining to claims 2 and 3, Yonehara (302) discloses a semiconductor device as claimed. See **FIG. 17**, where Yonehara (302) teaches a semiconductor device comprising:

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a source region **1711** and a drain region **1712**;

a channel formation region **1713** provided between said source region and said drain region and provided in a crystalline semiconductor comprising silicon **1706**;

wherein said channel formation region comprises an element selected from group IV elements other than silicon (column 11, line 47, i.e., carbon and germanium), and

wherein said channel formation region comprises a plurality of crystal grains provided in said crystalline semiconductor and extending in a same direction.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

10. Claims 4, 5, 6, 7, 12, 15, 18 and 21 are rejected under 35 U.S.C. 102(a) as being anticipated by Yonehara EP 0390 608.

11. Pertaining to claims 4, 5, 6 and 7, Yonehara (608) teaches a semiconductor device comprising:

a source region and a drain region (not numbered, however all thin film transistors inherently have source drain and channel formation regions);

a channel formation region provided between said source region and said drain region provided in a crystalline semiconductor comprising silicon;

wherein said channel formation region contains an element selected from group IV elements other than silicon, and

wherein said source region, said drain region and said channel formation region are arranged in parallel with a plane,

wherein said channel formation region comprises a plurality of crystal grains provided in said crystalline semiconductor,

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wherein said plurality of crystals are in parallel with said plane in parallel with which said source region, said drain region and said channel formation region are arranged, and wherein concentration of said element in said channel formation region is 5×10^{19} atoms/cm³ or less. Please note that Yonehara (608) teaches wherein an intersecting angle between said same direction and a direction connecting said source region and said drain region is adjusted in order to control resistance against movement of carriers in said channel formation region.

12. Pertaining to claims 12, 15, 18 and 21, Yonehara (608) teaches wherein said element is selected from the group consisting of Sn (page 3, line 51).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonehara U.S. Patent 5,422,302 as applied to claims 2 and 3 above and in further view of Yonehara EP 0 390 608.

15. Yonehara (302) discloses a semiconductor device substantially as claimed as discussed above. However, Yonehara 302 fails to disclose wherein said element according to claims 2 and 3 is selected from the group consisting of Sn and Pb. Yonehara (608) teaches a semiconductor device having an element from the group consisting of Sn. In view of Yonehara (608) it would have been obvious to one of ordinary skill in the art to incorporate Sn into the Yonehara (302)

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semiconductor device because Sn is added to an amorphous silicon layer to give large-grain-size polycrystalline layer (page 3, lines 25-29).

16. Claims 9, 11, 14, 16, 17, 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonehara U.S. Patent 5,422,302 in view of Yonehara, EP Patent Application EP 0 390 608 A2 as applied to claims 2, 3, 4, 5, 6, 7, 8, 10, 12, 15, 18 and 21 above and in further view of Ono et al., U.S. Patent 5,294,560.

17. Yonehara discloses a semiconductor device substantially as claimed as discussed above. However, Yonehara fails to teach wherein said semiconductor device is selected from the group consisting of an active matrix type display and an image sensor. Ono teaches a semiconductor device consisting of a active matrix display. See Title, in view of Ono, it would have been obvious to one of ordinary skill in the art to incorporate the active matrix type display of Ono into the Yonehara semiconductor device because they are adapted to serve individual picture elements (column 1, lines 22-30).

18. Claims 13, 16, 16, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonehara U.S. Patent 5,422,302 in view of Yonehara European Patent Application 0 390 608 as applied to claims 2, 3, 4, 5, 6, 7, 8, 10, 12, 15, 18 and 21 and further in view of Nakagiri et al., U.S. Patent 4,740,829.

19. Yonehara discloses a semiconductor device substantially as claimed as discussed above. However, Yonehara fails to teach wherein said concentration of said element is measured by Secondary Ion Mass Spectroscopy. Nakagiri teaches a semiconductor device wherein Secondary Ion Mass Spectroscopy measures a concentration of an element (column 4, lines 42-44). In view

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of Nakagiri, it would have been obvious to one of ordinary skill in the art to incorporate SIMS into the Yonehara semiconductor device because it is an analytical method to calculate the atomic percentage of the material in question (column 4, line 46).

Double Patenting

20. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

21. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

22. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

23. Claims 4-7 and 12-23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 6,160,279.

Although the conflicting claims are not identical, they are not patentably distinct from each other because it is well known that a formation region is a functional requirement for thin film transistor.

Conclusion

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

25. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

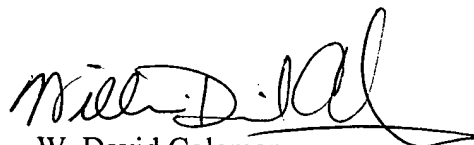
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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004. The examiner can normally be reached on 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



W. David Coleman
Examiner
Art Unit 2823

WDC
February 20, 2003